Pre-Calculus

Notes 9.3 – Sigma Notation and Arithmetic Series
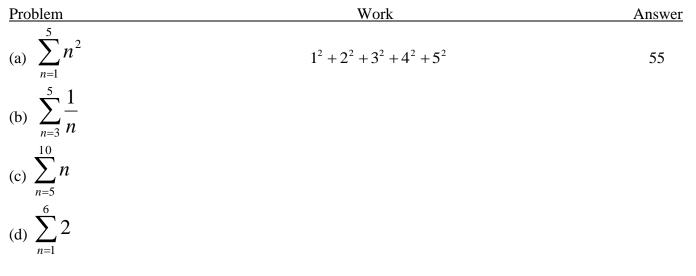
Sigma Notation or (Summation Notation)   This symbol means "Add" → $\sum$ It's called "Sigma"

$$\sum_{n=1}^{k} a_n$$

The variable below sigma (*n* in this case) is called the **"index"**
The number below sigma (1 in this case) is which term begins the series, called the **"lower bound"**
The number above sigma (k in this case) is which term ends the series, called the **"upper bound"**
The expression to the right of sigma (a_n in this case) is the **explicit formula** used to generate the terms of the series.

Ex 1) Using summation notation to find the sum of a finite sequence

Problem	Work	Answer
(a) $\displaystyle\sum_{n=1}^{5} n^2$	$1^2 + 2^2 + 3^2 + 4^2 + 5^2$	55
(b) $\displaystyle\sum_{n=3}^{5} \frac{1}{n}$		
(c) $\displaystyle\sum_{n=5}^{10} n$		
(d) $\displaystyle\sum_{n=1}^{6} 2$		

Ex2) Write the following sums using sigma notation:

a) $1+4+9+16+25+36+49+64+81$ **b)** $2+4+6+8+10+12$ **c)** $625+125+25+\cdots$

Now You Try ☺
a) $6+2-2-6-10-14-18-22$ **b)** $729+243+81+27+9+3$ **c)** $8+27+64+125$

FINITE ARITHMETIC SERIES $\displaystyle S_n = \sum_{k=1}^{n} a_k = \frac{n}{2}(a_1 + a_n)$ Gauss→$1+2+3+4+\cdots+100$

a) $1+3+5+7+\cdots+49$ **b)** $3+7+11+15+19+23+27$

c) A corner section of a stadium has 8 seats along the front row. Each successive row has 2 more seats than the row preceding it. If the top row has 24 seats how many seats are in the entire section?